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Application No. 09/989,714

Filed: November 20, 2001

TC Art Unit: 2674

Confirmation No.: 9578

THE CLAIMS

1. (Currently Amended) An optical sensor assembly for tracking movement of a surface comprising:

a curved or rounded target comprising said surface movably mounted to present a varying segment of said surface to a focus area, wherein said target is cylindrical; and

an optical sensor comprising a single sensing component, said sensing component mounted facing said surface of said target at said focus area, said optical sensor operative to compare images of said surface at known time intervals, wherein the single sensing component of said optical sensor detects a change in position of said surface in multiple directions, and said optical sensor is aligned placing said focus area perpendicular to a longitudinal axis of said cylindrical target and said surface is the circumferential surface of said cylindrical target.

2. (Previously Presented) The optical sensor assembly of claim 1 wherein said optical sensor is positioned substantially beneath said surface.

3. (Canceled)

4. (Currently Amended) The optical sensor assembly of ~~claim 3~~ claim 1, wherein said cylinder has a diameter greater than approximately 8mm.

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5. (Previously Presented) The optical sensor assembly of claim 4 wherein said cylinder has a diameter between approximately 8mm and 12mm.

6. (Previously Presented) The optical sensor assembly of claim 3 wherein said surface tracked by said optical sensor is textured.

7. (Previously Presented) The optical sensor assembly of claim 1 wherein said surface is adapted to move vertically and the response of said optical sensor is substantially invariant to said vertical motion.

8. (Previously Presented) The optical sensor assembly of claim 7 wherein said optical sensor is positioned perpendicular to and beneath said surface.

9. (Previously Presented) The optical sensor assembly of claim 7 further comprising a switch disposed beneath a portion of said surface, wherein said vertical movement of said surface activates said switch.

10. (Original) A mouse replacement device comprising said optical assembly of claim 1 and a rollerbar having a left end and a mounting end, wherein said rollerbar is adapted to traverse a left travel distance and an activation distance, and said focus area is located at approximately the sum of two times said left travel distance plus said activation distance from said left end of said roller bar.

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WEINGARTEN, SCHURGIN,
GAGNEBIN & LEBOVICI LLP
TEL. (617) 542-2290
FAX. (617) 451-0313

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11. (Original) The mouse replacement device of claim 10 wherein said rollerbar has a first portion having a shiny hard surface and a second portion having a textured surface, said sensing component focused on said second portion.

12.-47. (Canceled)

48. (Previously Presented) The optical sensor assembly of claim 7 wherein said optical sensor moves with said surface maintaining a constant distance and orientation to said surface.

49. (Canceled)

50. (Currently Amended) A cursor control device comprising:
a base;
a support mechanism supported on said base;
a curved or rounded target comprising a surface movably mounted on said support mechanism to present a varying segment of said surface to a focus area, wherein the surface is translatably supported by said support mechanism; and
an optical sensor comprising a single sensing component, said sensing component mounted facing said surface of said target at said focus area, said optical sensor operative to compare images of said surface at known time intervals, wherein the single sensing component of said optical sensor detects a change in position of said surface in multiple directions.

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51. (Previously Presented) The cursor control device of claim 50, wherein the support mechanism comprises a member extending from a first end to a second end.

52. (Previously Presented) The cursor control device of claim 50, wherein the support mechanism comprises a member extending from a support element at a first end to a support element at a second end.

53. (Previously Presented) The cursor control device of claim 50, wherein the support mechanism comprises a member extending from a support element at a first end to a spring member at a second end.

54. (Previously Presented) The cursor control device of claim 50, wherein the support mechanism comprises a member extending from a mount at a first end to a switch mechanism at a second end, the support member disposed for reciprocal translation having a vertical component into and out of contact with the switch mechanism.

55. (Previously Presented) The cursor control device of claim 50, wherein the surface is rollably supported by said support mechanism.

56. (Previously Presented) The cursor control device of claim 50, wherein the surface is rollably supported by a bearing mechanism on said support mechanism.

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57. (Canceled)

58. (Previously Presented) The cursor control device of claim 50, wherein the surface is translatably supported by a bearing mechanism on said support mechanism.

59. (Previously Presented) The cursor control device of claim 50, wherein the surface comprises a sleeve rotatable via a bearing mechanism around the support mechanism and translatable along the support mechanism, rotation and translation of the sleeve being interpretable by the sensor.

60. (Previously Presented) The cursor control device of claim 50, wherein the surface has a matte texture.

61. (Previously Presented) The cursor control device of claim 50, wherein the surface is texturized.

62. (Canceled)

63. (Canceled)

64. (Previously Presented) The optical sensor assembly of claim 1, wherein the surface of said target is cylindrical.

65. (Previously Presented) The optical sensor assembly of claim 1, wherein the surface of said target comprises a rollerbar.

66. (Canceled)

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67. (Previously Presented) The optical sensor assembly of claim 1, wherein the surface of said target comprises a surface supported by a rolling mechanism.

68. (Previously Presented) The optical sensor assembly of claim 1, wherein said surface is translatably and rollably mounted to present the varying segment of said surface to the focus area.

69. (Previously Presented) The optical sensor assembly of claim 1, wherein the single sensing component is operative to sense translational motion and rolling motion of said surface.

70. (Previously Presented) The optical sensor assembly of claim 1, wherein said surface is translatably and rotatably mounted to present the varying segment of said surface to the focus area.

71. (Previously Presented) The optical sensor assembly of claim 1, wherein the single sensing component is operative to sense translational motion and rotational motion of said surface.

72. (Canceled)

73. (Canceled)

74. (Previously Presented) The cursor control device of claim 50, wherein the surface of said target is cylindrical.

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75. (Previously Presented) The cursor control device of claim 50, wherein said surface is translatably and rollably mounted to present the varying segment of said surface to the focus area.

76. (Previously Presented) The cursor control device of claim 50, wherein the single sensing component is operative to sense translational motion and rolling motion of said surface.

77. (Previously Presented) The cursor control device of claim 50, wherein said surface is translatably and rotationally mounted to present the varying segment of said surface to the focus area.

78. (Previously Presented) The cursor control device of claim 50, wherein the single sensing component is operative to sense translational motion and rotational motion of said surface.

79. (Previously Presented) The cursor control device of claim 50, wherein the support mechanism comprises a member extending from a first end to a second end, the member cantilevered from a mount at the first end.

80. (Previously Presented) The cursor control device of claim 79, wherein the first end of the member extends from the mount at an upward angle to form a bow in the member between the first end and the second end.

81. (Previously Presented) The cursor control device of claim 79, wherein the second end floats on a switch in a rest position.

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82. (Previously Presented) The cursor control device of claim 50, wherein the support mechanism comprises a member having a bowed shape from a first end to a second end.

83. (Previously Presented) The cursor control device of claim 50, wherein the support mechanism comprises a springy member having a bowed shape from a first end to a second end.

84. (Previously Presented) The cursor control device of claim 83, further comprising a tension adjustment device disposed to adjust the bowed shape of the springy member.

85. (Previously Presented) The cursor control device of claim 84, wherein the tension adjustment device is disposed to adjust the angle of the springy member from horizontal at the first end.

86. (Previously Presented) The optical sensor assembly of claim 1, wherein the optical sensor is operative to detect patterns in the surface, the patterns comprising the images to be compared.

87. (Previously Presented) The cursor control device of claim 50, wherein the optical sensor is operative to detect patterns in the surface, the patterns comprising the images to be compared.

88. (New) An optical sensor assembly for tracking movement of a surface comprising:

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a curved or rounded target comprising said surface movably mounted to present a varying segment of said surface to a focus area, wherein said surface is movable vertically; and

an optical sensor comprising a single sensing component, said sensing component mounted facing said surface of said target at said focus area, said optical sensor operative to compare images of said surface at known time intervals, wherein the single sensing component of said optical sensor detects a change in position of said surface in multiple directions, and the response of said optical sensor is substantially invariant to said vertical motion of said surface.

89. (New) The optical sensor assembly of claim 88, wherein said optical sensor is positioned perpendicular to and beneath said surface.

90. (New) The optical sensor assembly of claim 88 further comprising a switch disposed beneath a portion of said surface, wherein said vertical movement of said surface activates said switch.

91. (New) A mouse replacement device comprising:

an optical sensor assembly for tracking movement of a surface comprising:

a curved or rounded target comprising said surface movably mounted to present a varying segment of said surface to a focus area, and

an optical sensor comprising a single sensing component, said sensing component mounted facing said surface of said

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target at said focus area, said optical sensor operative to compare images of said surface at known time intervals, wherein the single sensing component of said optical sensor detects a change in position of said surface in multiple directions; and

a rollerbar having a left end and a mounting end, said target formed on said rollerbar, wherein said rollerbar is traversable a left travel distance and an activation distance, and said focus area is located at approximately the sum to two times said left travel distance plus said activation distance from said left end of said rollerbar.

92. (New) The mouse replacement device of claim 91 wherein said rollerbar has a first portion having a shiny hard surface and a second portion having a textured surface, said sensing component focused on said second portion.

93. (New) A cursor control device comprising:

a base;

a support mechanism supported on said base;

a curved or rounded target comprising a surface movably mounted on said support mechanism to present a varying segment of said surface to a focus area; and

an optical sensor comprising a single sensing component, said sensing component mounted facing said surface of said target at said focus area, said optical sensor operative to compare images of said surface at known time intervals, wherein the single sensing component of said optical sensor detects a change in position of said surface in multiple directions;

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WEINGARTEN, SCHURGIN,
GAGNEBIN & LEBOVICI LLP
TEL. (617) 542-2290
FAX. (617) 451-0313

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wherein the surface comprises a sleeve rotatable via a bearing mechanism around the support mechanism and translatable along the support mechanism, rotation and translation of the sleeve being interpretable by the sensor.

94. (New) A cursor control device comprising:

- a base;
- a support mechanism supported on said base;
- a curved or rounded target comprising a surface movably mounted on said support mechanism to present a varying segment of said surface to a focus area, wherein the surface has a matte texture; and

- an optical sensor comprising a single sensing component, said sensing component mounted facing said surface of said target at said focus area, said optical sensor operative to compare images of said surface at known time intervals, wherein the single sensing component of said optical sensor detects a change in position of said surface in multiple directions.

95. (New) An optical sensor assembly for tracking movement of a surface comprising:

- a curved or rounded target comprising said surface movably mounted to present a varying segment of said surface to a focus area, wherein the surface of said target is cylindrical; and

- an optical sensor comprising a single sensing component, said sensing component mounted facing said surface of said target at said focus area, said optical sensor operative to compare images of said surface at known time intervals, wherein the single

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sensing component of said optical sensor detects a change in position of said surface in multiple directions.

96. (New) The optical sensor assembly of claim 95, wherein the surface of said target is supported by a rolling mechanism.

97. (New) The optical sensor assembly of claim 95, wherein said surface is translatably and rollably mounted to present the varying segment of said surface to the focus area.

98. (New) The optical sensor assembly of claim 95, wherein the single sensing component is operative to sense translational motion and rolling motion of said surface.

99. (New) The optical sensor assembly of claim 95, wherein said surface is translatably and rotatably mounted to present the varying segment of said surface to the focus area.

100. (New) The optical sensor assembly of claim 95, wherein the single sensing component is operative to sense translational motion and rotational motion of said surface.

101. (New) The optical sensor assembly of claim 95, wherein the optical sensor is operative to detect patterns in the surface, the patterns comprising the images to be compared.

102. (New) An optical sensor assembly for tracking movement of a surface comprising:

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a curved or rounded target comprising said surface movably mounted to present a varying segment of said surface to a focus area, wherein the surface of said target comprises a rollerbar; and

an optical sensor comprising a single sensing component, said sensing component mounted facing said surface of said target at said focus area, said optical sensor operative to compare images of said surface at known time intervals, wherein the single sensing component of said optical sensor detects a change in position of said surface in multiple directions.

103. (New) An optical sensor assembly for tracking movement of a surface comprising:

a curved or rounded target comprising said surface movably mounted to present a varying segment of said surface to a focus area; and

an optical sensor comprising a single sensing component, said sensing component mounted facing said surface of said target at said focus area, said optical sensor operative to compare images of said surface at known time intervals, wherein the single sensing component of said optical sensor detects a change in position of said surface in multiple directions;

wherein said surface is translatably and rollably mounted to present the varying segment of said surface to the focus area.

104. (New) An optical sensor assembly for tracking movement of a surface comprising:

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a curved or rounded target comprising said surface movably mounted to present a varying segment of said surface to a focus area; and

an optical sensor comprising a single sensing component, said sensing component mounted facing said surface of said target at said focus area, said optical sensor operative to compare images of said surface at known time intervals, wherein the single sensing component of said optical sensor detects a change in position of said surface in multiple directions;

wherein the single sensing component is operative to sense translational motion and rolling motion of said surface.

105. (New) An optical sensor assembly for tracking movement of a surface comprising:

a curved or rounded target comprising said surface movably mounted to present a varying segment of said surface to a focus area; and

an optical sensor comprising a single sensing component, said sensing component mounted facing said surface of said target at said focus area, said optical sensor operative to compare images of said surface at known time intervals, wherein the single sensing component of said optical sensor detects a change in position of said surface in multiple directions;

wherein said surface is translatably and rotatably mounted to present the varying segment of said surface to the focus area.

106. (New) An optical sensor assembly for tracking movement of a surface comprising:

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a curved or rounded target comprising said surface movably mounted to present a varying segment of said surface to a focus area; and

an optical sensor comprising a single sensing component, said sensing component mounted facing said surface of said target at said focus area, said optical sensor operative to compare images of said surface at known time intervals, wherein the single sensing component of said optical sensor detects a change in position of said surface in multiple directions;

wherein the single sensing component is operative to sense translational motion and rotational motion of said surface.

107. (New) A cursor control device comprising:

a base;

a support mechanism supported on said base;

a curved or rounded target comprising a surface movably mounted on said support mechanism to present a varying segment of said surface to a focus area, wherein the surface of said target is cylindrical; and

an optical sensor comprising a single sensing component, said sensing component mounted facing said surface of said target at said focus area, said optical sensor operative to compare images of said surface at known time intervals, wherein the single sensing component of said optical sensor detects a change in position of said surface in multiple directions.

108. (New) The cursor control device of claim 107, wherein the surface is rollably supported by said support mechanism.

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109. (New) The cursor control device of claim 107, wherein the surface is rollably supported by a bearing mechanism on said support mechanism.

110. (New) The cursor control device of claim 107, wherein the surface is translatably supported by said support mechanism.

111. (New) The cursor control device of claim 107, wherein the surface is translatably supported by a bearing mechanism on said support mechanism.

112. (New) A cursor control device comprising:

a base;

a support mechanism supported on said base;

a curved or rounded target comprising a surface movably mounted on said support mechanism to present a varying segment of said surface to a focus area; and

an optical sensor comprising a single sensing component, said sensing component mounted facing said surface of said target at said focus area, said optical sensor operative to compare images of said surface at known time intervals, wherein the single sensing component of said optical sensor detects a change in position of said surface in multiple directions;

wherein said surface is translatably and rollably mounted to present the varying segment of said surface to the focus area.

113. (New) A cursor control device comprising:

a base;

a support mechanism supported on said base;

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WEINGARTEN, SCHURGIN,
GAGNEBIN & LEBOVICI LLP
TEL: (617) 542-2290
FAX: (617) 451-0313

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a curved or rounded target comprising a surface movably mounted on said support mechanism to present a varying segment of said surface to a focus area; and

an optical sensor comprising a single sensing component, said sensing component mounted facing said surface of said target at said focus area, said optical sensor operative to compare images of said surface at known time intervals, wherein the single sensing component of said optical sensor detects a change in position of said surface in multiple directions;

wherein the single sensing component is operative to sense translational motion and rolling motion of said surface.

114. (New) A cursor control device comprising:

a base;

a support mechanism supported on said base;

a curved or rounded target comprising a surface movably mounted on said support mechanism to present a varying segment of said surface to a focus area; and

an optical sensor comprising a single sensing component, said sensing component mounted facing said surface of said target at said focus area, said optical sensor operative to compare images of said surface at known time intervals, wherein the single sensing component of said optical sensor detects a change in position of said surface in multiple directions;

wherein said surface is translatably and rotationally mounted to present the varying segment of said surface to the focus area.

115. (New) A cursor control device comprising:

a base;

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a support mechanism supported on said base;
a curved or rounded target comprising a surface movably mounted on said support mechanism to present a varying segment of said surface to a focus area; and
an optical sensor comprising a single sensing component, said sensing component mounted facing said surface of said target at said focus area, said optical sensor operative to compare images of said surface at known time intervals, wherein the single sensing component of said optical sensor detects a change in position of said surface in multiple directions;
wherein the single sensing component is operative to sense translational and rotational motion of said surface.

116. (New) A cursor control device comprising:

a base;
a support mechanism supported on said base, wherein the support mechanism comprises a member extending from a first end to a second end, the member cantilevered from a mount at the first end;
a curved or rounded target comprising a surface movably mounted on said support mechanism to present a varying segment of said surface to a focus area; and
an optical sensor comprising a single sensing component, said sensing component mounted facing said surface of said target at said focus area, said optical sensor operative to compare images of said surface at known time intervals, wherein the single sensing component of said optical sensor detects a change in position of said surface in multiple directions.

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117. (New Presented) The cursor control device of claim 116, wherein the first end of the member extends from the mount at an upward angle to form a bow in the member between the first end and the second end.

118. (New) The cursor control device of claim 116, wherein the second end floats on a switch in a rest position.

119. (New) A cursor control device comprising:

a base;

a support mechanism supported on said base, wherein the support mechanism comprises a member having a bowed shaped from a first end to a second end;

a curved or rounded target comprising a surface movably mounted on said support mechanism to present a varying segment of said surface to a focus area; and

an optical sensor comprising a single sensing component, said sensing component mounted facing said surface of said target at said focus area, said optical sensor operative to compare images of said surface at known time intervals, wherein the single sensing component of said optical sensor detects a change in position of said surface in multiple directions.

120. (New) A cursor control device comprising:

a base;

a support mechanism supported on said base, wherein the support mechanism comprises a springy member having a bowed shaped from a first end to a second end;

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a curved or rounded target comprising a surface movably mounted on said support mechanism to present a varying segment of said surface to a focus area; and

an optical sensor comprising a single sensing component, said sensing component mounted facing said surface of said target at said focus area, said optical sensor operative to compare images of said surface at known time intervals, wherein the single sensing component of said optical sensor detects a change in position of said surface in multiple directions.

121. (New) The cursor control device of claim 120, further comprising a tension adjustment device disposed to adjust the bowed shape of the springy member.

122. (New) The cursor control device of claim 121, wherein the tension adjustment device is disposed to adjust the angle of the springy member from horizontal at the first end.